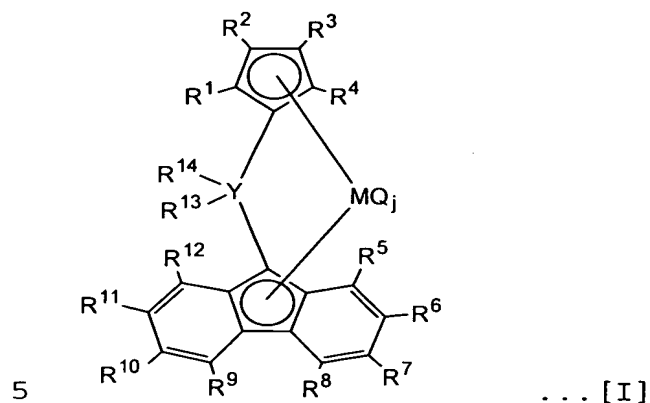


## CLAIMS

1. A bridged metallocene compound represented by the formula [I]:



wherein Y is a carbon, silicon, germanium or tin atom; M is Ti, Zr or Hf;  $R^1$  to  $R^{12}$ , which may be the same or different, are each hydrogen, a hydrocarbon group or a silicon-containing group; neighboring substituents of  $R^5$  to  $R^{12}$  may be linked with each other to form a ring;  $R^{13}$  and  $R^{14}$ , which may be the same or different, are each a hydrocarbon group or a silicon-containing group and may be linked with each other to form a ring (when  $R^5$  to  $R^{12}$  are all hydrogen or when  $R^6$  and  $R^{11}$  are both hydrocarbon groups,  $R^{13}$  and  $R^{14}$  are hydrocarbon groups other than phenyl, methyl and cyclohexylidene groups, and when  $R^7$  and  $R^{10}$  are both hydrocarbon groups,  $R^{13}$  and  $R^{14}$  are hydrocarbon groups other than phenyl and methyl groups); Q is a halogen, a hydrocarbon group, an anionic ligand or a neutral ligand capable of coordination by a lone pair of electrons, and may

10

15

be the same or different when plural; and  $j$  is an integer from 1 to 4.

2. The bridged metallocene compound of the formula  
5 [I] as claimed in claim 1, wherein  $R^{13}$  and  $R^{14}$  are unsubstituted or substituted aryl groups, at least one of which is a substituted aryl group, and  $M$  is Ti or Zr.

3. The bridged metallocene compound of the formula  
10 [I] as claimed in claim 2, wherein  $R^{13}$  or  $R^{14}$  is a substituted aryl group which has one or more substituents of the same or different kind selected from hydrocarbon groups of 1 to 20 carbon atoms, halogen-containing hydrocarbon groups, halogen atoms, oxygen-containing groups and nitrogen-containing  
15 groups.

4. The bridged metallocene compound of the formula  
[I] as claimed in claim 1, wherein either or both of  $R^{13}$  and  $R^{14}$  is represented by  $R^{15}R^{16}CH-$ , in which  $R^{15}$  and  $R^{16}$  are each  
20 hydrogen, a hydrocarbon group or a silicon-containing group.

5. The bridged metallocene compound of the formula  
[I] as claimed in claim 4, wherein either or both of  $R^{13}$  and  $R^{14}$  is represented by  $R^{15}R^{16}CH-$ , in which  $R^{15}$  and  $R^{16}$  are linked

with each other to form a ring.

6. The bridged metallocene compound of the formula [I] as claimed in claim 1, wherein Y is a carbon atom; R<sup>13</sup> and R<sup>14</sup> are linked with each other to form a cycloalkylidene group represented by -CH<sub>2</sub>(CH<sub>2</sub>)<sub>n</sub>-, in which n is an integer from 1 to 10; and R<sup>7</sup> and R<sup>10</sup> are hydrocarbon groups of 1 to 20 carbon atoms.

7. The bridged metallocene compound of the formula [I] as claimed in claim 1, wherein arbitrary three or more substituents of R<sup>5</sup> to R<sup>12</sup> are hydrocarbon groups of 1 to 20 carbon atoms or silicon-containing groups.

8. The bridged metallocene compound of the formula [I] as claimed in claim 7, wherein R<sup>6</sup>, R<sup>7</sup>, R<sup>10</sup> and R<sup>11</sup> are hydrocarbon groups of 1 to 20 carbon atoms or silicon-containing groups.

9. The bridged metallocene compound of the formula [I] as claimed in claim 7, wherein R<sup>6</sup> and R<sup>7</sup>, and R<sup>10</sup> and R<sup>11</sup> are linked with each other to form rings.

10. The bridged metallocene compound of the formula [I] as claimed in claim 1, wherein R<sup>5</sup> to R<sup>12</sup> are not hydrogen

at the same time;  $R^6$  and  $R^{11}$  are not t-butyl groups when  $R^{13}$  and  $R^{14}$  are methyl or phenyl groups; and Y is a silicon, germanium or tin atom.

5            11.    The bridged metallocene compound of the formula [I] as claimed in claim 10, wherein Y is a silicon or germanium atom.

12.    The bridged metallocene compound of the formula  
10    [I] as claimed in claim 1, wherein  $R^1$  to  $R^4$  are all hydrogen.

13.    An olefin polymerization catalyst comprising the bridged metallocene compound of claim 1.

15            14.    An olefin polymerization catalyst comprising:  
              (A) the bridged metallocene compound of any one of claims  
1 to 12 and

              (B) at least one compound selected from:

                  (B-1) an organometallic compound,

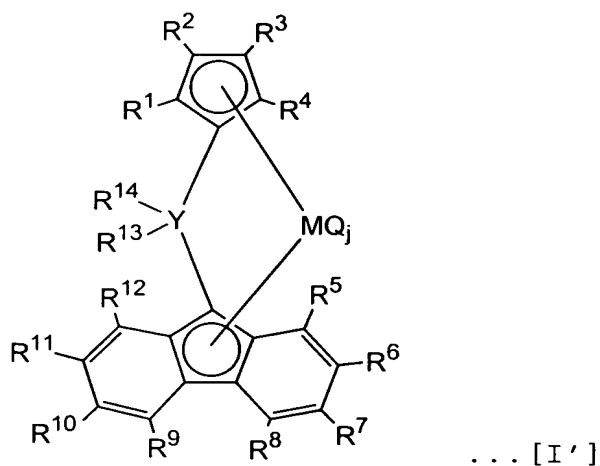
20                    (B-2) an organoaluminum oxy-compound and

                  (B-3) a compound which reacts with the metallocene compound (A) to form an ion pair.

15.    A method for olefin polymerization, in which one

or more monomers, essentially ethylene, selected from ethylene and  $\alpha$ -olefins are polymerized in the presence of the olefin polymerization catalyst of claim 14 so that an ethylene based polymer with an ethylene content of more than 50 mol% is  
 5 obtained.

16. A method for olefin polymerization, in which one or more monomers, essentially ethylene, selected from ethylene and  $\alpha$ -olefins are polymerized in the presence of an  
 10 olefin polymerization catalyst which comprises a bridged metallocene compound of the formula [I'] so that an ethylene based polymer with an ethylene content of more than 50 mol% is obtained:



15 wherein Y is a carbon, silicon, germanium or tin atom; M is Ti, Zr or Hf;  $R^1$  to  $R^{12}$ , which may be the same or different, are each hydrogen, a hydrocarbon group or a silicon-containing group;  $R^5$  to  $R^{12}$  are not hydrogen at the same time; neighboring

substituents of  $R^5$  to  $R^{12}$  may be linked with each other to form a ring;  $R^{13}$  and  $R^{14}$ , which may be the same or different, are each a hydrocarbon group or a silicon-containing group and may be linked with each other to form a ring; Q is a halogen, a hydrocarbon group, an anionic ligand or a neutral ligand capable of coordination by a lone pair of electrons, and may be the same or different when plural; and j is an integer from 1 to 4.

10            17.    The method for olefin polymerization as claimed in claim 15 or 16, wherein the metallocene compound of the formula [I] or [I'] has been supported on a carrier.

15

20